#31

1.6 Angle Pair Relationships

Goals
- Identify vertical angles and linear pairs.
- Identify complementary and supplementary angles.

VOCABULARY

Vertical angles

Linear pair

Complementary angles

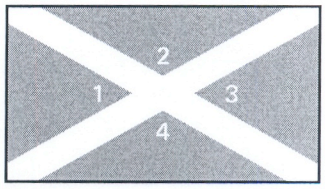
Complement

Supplementary angles

Supplement

Example 1 *Finding Angle Measures*

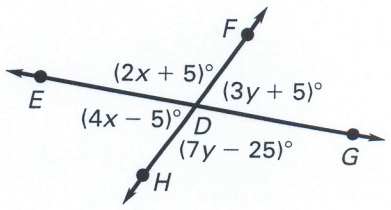
In the flag shown at the right, $\angle 1$ has a measure of 60°. Find $m\angle 2$ and $m\angle 3$.



Example 2 ***Finding Angle Measures***

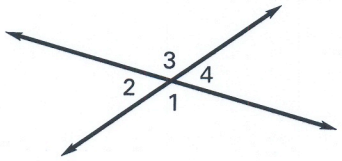
Solve for x and y. Then find the angle measures.

Use the fact that the sum of the measures of angles that form a linear pair is .

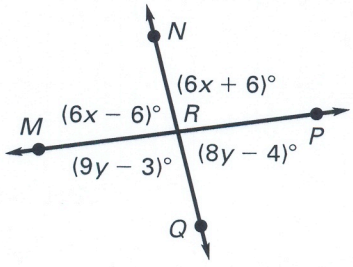


✔ ***Checkpoint*** **Complete the following exercises.**

1. The measure of $\angle 2$ is 52°. Find the measures of $\angle 1$, $\angle 3$, and $\angle 4$.



2. Solve for x and y. Then find the angle measures.



#32

Example 4 ***Finding Measures of Complements and Supplements***

a. Given that $\angle S$ is a complement of $\angle T$ and $m\angle S = 32°$, find $m\angle T$.

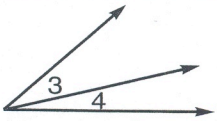
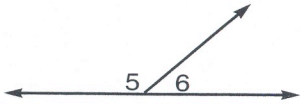
b. Given that $\angle U$ is a supplement of $\angle V$ and $m\angle U = 27°$, find $m\angle V$.

5. $\angle M$ is a complement of $\angle N$ and $m\angle M = 63°$. Find $m\angle N$.	**6.** $\angle C$ is a supplement of $\angle D$ and $m\angle C = 109°$. Find $m\angle D$.

3–4 Study Guide

NAME _____ DATE _____ PERIOD _____

Adjacent Angles and Linear Pairs of Angles

Pairs of Angles		
Special Name	**Definition**	**Examples**
adjacent angles	angles in the same plane that have a common vertex and a common side, but no common interior points	 $\angle 3$ and $\angle 4$ are adjacent angles.
linear pair	adjacent angles whose noncommon sides are opposite rays	 $\angle 5$ and $\angle 6$ form a linear pair.

$m\angle 1 = 45$, $m\angle 2 = 135$, $m\angle 3 = 125$, $m\angle 4 = 45$, $m\angle 5 = 135$, $m\angle 6 = 35$, and $\angle CAT$ is a right angle. Determine whether each statement is true or false.

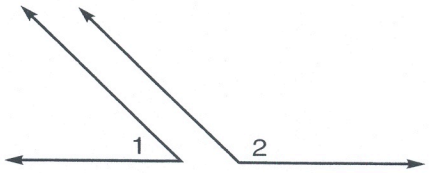
1. $\angle 1$ and $\angle 2$ form a linear pair.

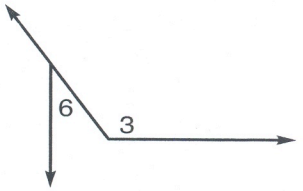
2. $\angle 4$ and $\angle 5$ form a linear pair.

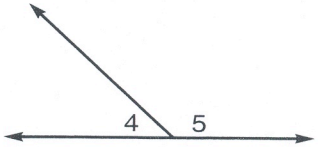
3. $\angle 6$ and $\angle 3$ are adjacent angles.

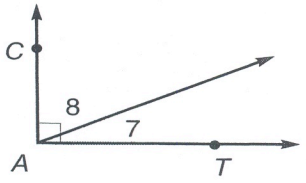
4. $\angle 7$ and $\angle 8$ are adjacent angles.

5. $\angle CAT$ and $\angle 7$ are adjacent angles.



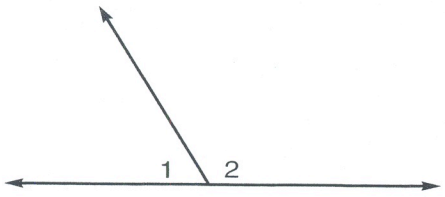




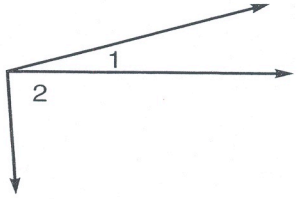


Use the terms* adjacent angles, linear pair, *or* neither *to describe angles 1 and 2 in as many ways as possible.

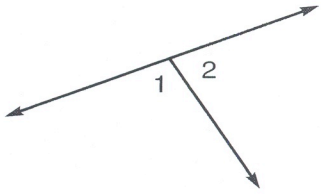
6.



7.



8.

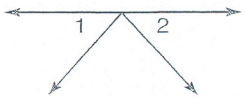


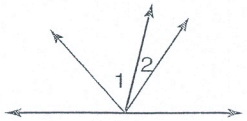
NAME _____ DATE _____ PERIOD _____ #33

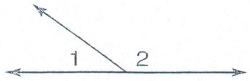
3–4 Skills Practice

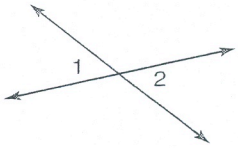
Adjacent Angles and Linear Pairs of Angles

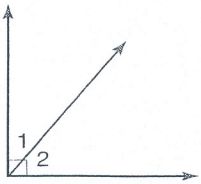
Use the terms adjacent angles, linear pair, *or* neither *to describe angles 1 and 2 in as many ways as possible.*

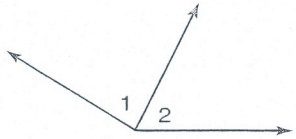
1. 

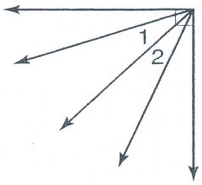
2. 

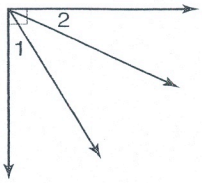
3. 

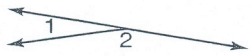
4. 

5. 

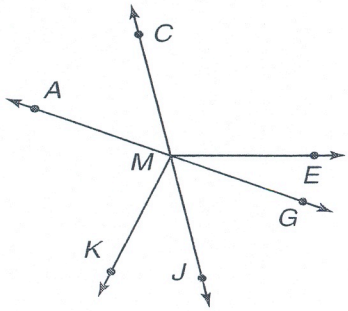
6. 

7. 

8. 

9. 

In the figure at the right, $\overrightarrow{MA}$ and $\overrightarrow{MG}$ are opposite rays. Also, $\overrightarrow{MC}$ and $\overrightarrow{MJ}$ are opposite rays.



10. Which angle forms a linear pair with $\angle AMC$?

11. Do $\angle CME$ and $\angle EMJ$ form a linear pair? Justify your answer.

12. Name two angles that are adjacent to $\angle EMG$.

13. Name two angles that form a linear pair with $\angle JMG$.

14. Name three angles that are adjacent to $\angle AMK$.

3-5

NAME _____ DATE _____ PERIOD _____

Study Guide

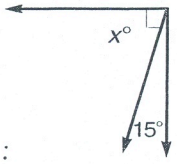
Complementary and Supplementary Angles

The table identifies several different types of angles that occur in pairs.

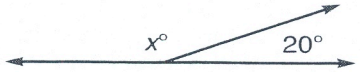
Pairs of Angles		
Special Name	**Definition**	**Examples**
complementary angles	two angles whose measures have a sum of 90	
supplementary angles	two angles whose measures have a sum of 180	

Each pair of angles is either complementary or supplementary. Find the value of x in each figure.

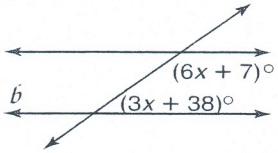
1.



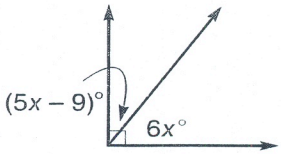
2.



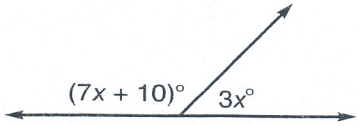
3.



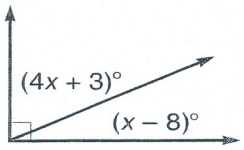
4.



5.



6.



7. If $m\angle P = 28$, $\angle R$ and $\angle P$ are supplementary, $\angle T$ and $\angle P$ are complementary, and $\angle Z$ and $\angle T$ are complementary, find $m\angle R$, $m\angle T$, and $m\angle Z$.

8. If $\angle S$ and $\angle G$ are supplementary, $m\angle S = 6x + 10$, and $m\angle G = 15x + 23$, find x and the measure of each angle.

3-5

NAME _____ DATE _____ PERIOD _____

Skills Practice

Complementary and Supplementary Angles

Refer to the figures at the right.

1. Name a pair of complementary angles.

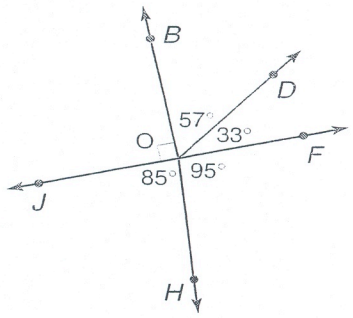
2. Name two right angles.

3. Name three pairs of adjacent supplementary angles.

4. Find the measure of an angle that is complementary to $\angle JOH$.

5. Find the measure of an angle that is supplementary to $\angle DOF$.

6. Find the measure of $\angle BOH$.



Exercises 1-6

7. Name a pair of complementary angles.

8. Name two right angles.

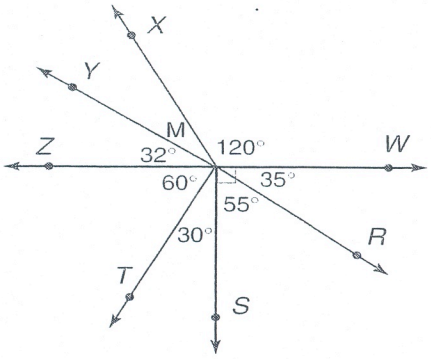
9. Find the measure of an angle that is complementary to $\angle YMZ$.

10. Find the measure of an angle that is supplementary to $\angle WMT$.

11. Find the measure of $\angle XMY$.

12. Is $\angle YMT$ a right angle? Justify your answer.

13. Find the measure of an angle that is supplementary to $\angle XMR$.



Exercises 7-13

14. Find $m\angle 3$ if $\angle 3$ and $\angle 4$ form a linear pair and $m\angle 4 = 55$.

15. If $\angle 1$ and $\angle 2$ form a linear pair and $m\angle 1 = 130$, find $m\angle 2$.

16. Angles DEF and XYZ form a linear pair. If $m\angle DEF = 170$, what is $m\angle XYZ$?

17. If $\angle 4$ and $\angle 8$ are complementary and $m\angle 4 = 45$, find $m\angle 8$.

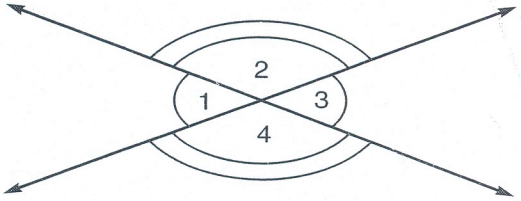
18. If $m\angle 3 = 10$ and $\angle 3$ and $\angle 7$ are complementary, what is $m\angle 7$?

3–6 Study Guide

NAME _____ DATE _____ PERIOD _____

Congruent Angles

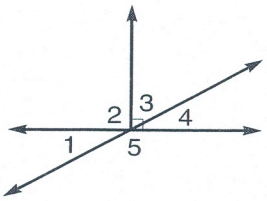
Opposite angles formed by intersecting lines are called **vertical angles**. Vertical angles are always congruent. $\angle 1$ and $\angle 3$, and $\angle 2$ and $\angle 4$ are pairs of vertical angles.



***Identify each pair of angles in Exercises 1–4 as* adjacent, vertical, complementary, supplementary, *and/or as a* linear pair.**

1. $\angle 1$ and $\angle 2$

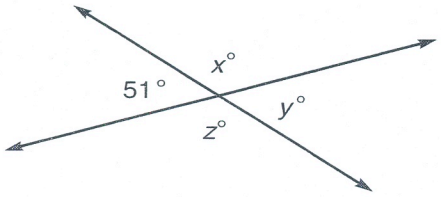
2. $\angle 1$ and $\angle 4$



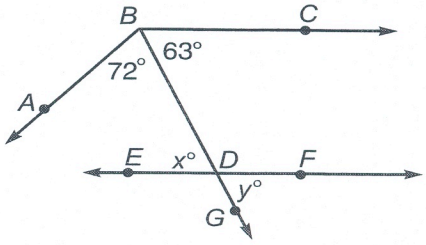
3. $\angle 3$ and $\angle 4$

4. $\angle 1$ and $\angle 5$

5. Find x, y, and z.

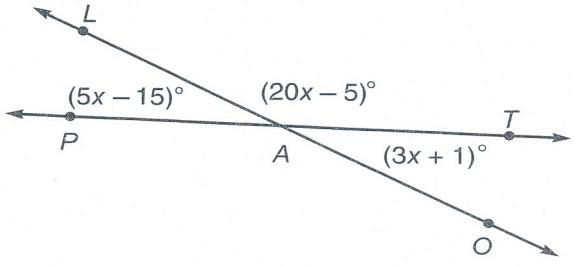


6. Find x and y if $\angle CBD \cong \angle FDG$.



Use the figure shown to find each of the following.

7. x



8. $m\angle LAT$

9. $m\angle TAO$

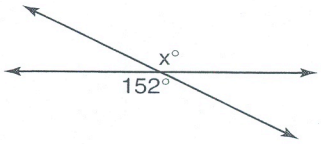
10. $m\angle PAO$

NAME DATE PERIOD

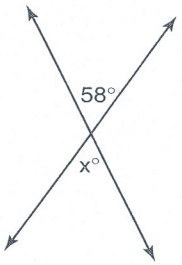
Congruent Angles

Find the value of x in each figure.

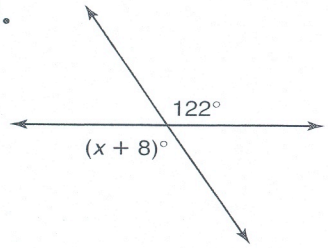
1.



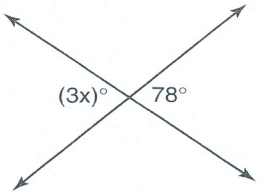
2.



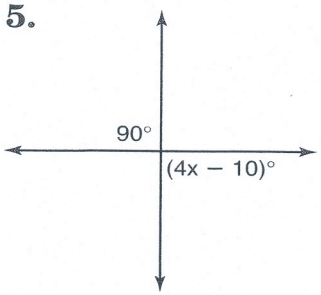
3.



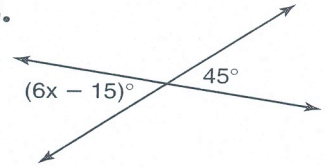
4.



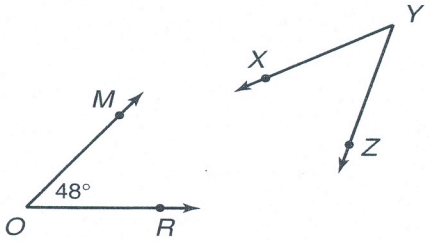
5.



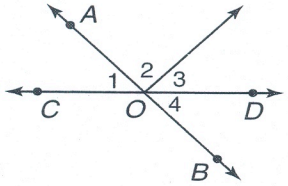
6.



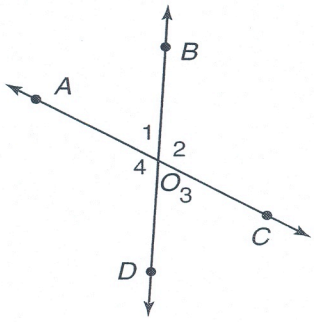
7. What is the measure of an angle complementary to $\angle XYZ$ if $\angle MOR \cong \angle XYZ$?



8. $\overrightarrow{OA}$ and $\overrightarrow{OB}$ are opposite rays and $\overrightarrow{OC}$ and $\overrightarrow{OD}$ are also opposite rays. If $m\angle 2 = 90$ and $m\angle 1$ and $= 45$, what is $m\angle 4$?



Use the figure at the right.



9. If $\angle 1 \cong \angle 3$ and $m\angle 1 = 64$, find the measure of an angle that is supplementary to $\angle 3$.

10. If $\angle AOB$ is supplementary to $\angle BOC$, $\angle BOC$ is supplementary to $\angle COD$, and $m\angle AOB = 58$, find $m\angle BOC$ and $m\angle COD$.

11. Find the measure of an angle that is complementary to $\angle 1$ if $\angle 1 \cong \angle 2$ and $m\angle 2 = 75$.

12. Find the measure of an angle that is supplementary to $\angle 4$ if $\angle 4 \cong \angle 9$ and $m\angle 9 = 24$.

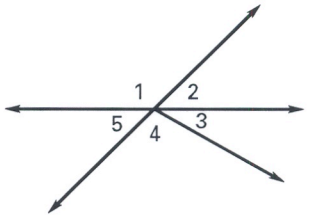
LESSON 1.6

NAME _____ DATE _____

Practice A

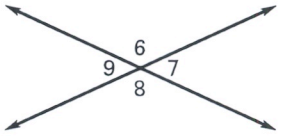
For use with pages 44–50

Use the figure at the right.



1. Are $\angle 1$ and $\angle 2$ adjacent?
2. Are $\angle 1$ and $\angle 2$ a linear pair?
3. Are $\angle 3$ and $\angle 4$ a linear pair?
4. Are $\angle 2$ and $\angle 5$ vertical angles?
5. Are $\angle 1$ and $\angle 4$ vertical angles?
6. Are $\angle 3$ and $\angle 5$ vertical angles?

Use the figure at the right.

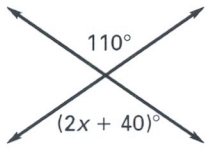


7. If $m\angle 6 = 78°$, then $m\angle 7 =$ ___?___.
8. If $m\angle 8 = 94°$, then $m\angle 6 =$ ___?___.
9. If $m\angle 9 = 124°$, then $m\angle 8 =$ ___?___.
10. If $m\angle 7 = 47°$, then $m\angle 9 =$ ___?___.
11. If $m\angle 8 = 158°$, then $m\angle 9 =$ ___?___.
12. If $m\angle 7 = 15°$, then $m\angle 6 =$ ___?___.

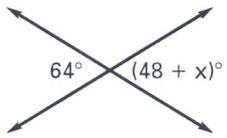
In Exercises 13–16, assume $\angle A$ and $\angle B$ are complementary and $\angle B$ and $\angle C$ are supplementary.

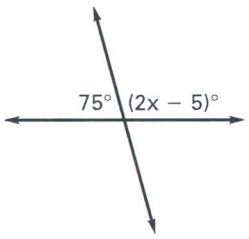
13. If $m\angle A = 42°$, then $m\angle B =$ ___?___ and $m\angle C =$ ___?___.
14. If $m\angle B = 78°$, then $m\angle A =$ ___?___ and $m\angle C =$ ___?___.
15. If $m\angle A = 17°$, then $m\angle B =$ ___?___ and $m\angle C =$ ___?___.
16. If $m\angle B = 45°$, then $m\angle A =$ ___?___ and $m\angle C =$ ___?___.

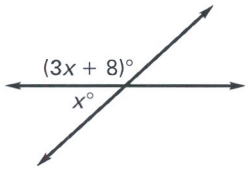
Find the value of the variable.

17. 

18. 

19. 

20. 

21. 

22.